



# BOTHELL CITYWIDE BIKE PLAN

May 2022 | DRAFT PLAN



City of Bothell™

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# EXECUTIVE SUMMARY

## OVERVIEW

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The intent of the Bothell Citywide Bike Plan is to set a vision of a state-of-the art bicycle system throughout Bothell, provide a means to achieve it, and provide improved facilities while working toward it. The goal is to provide a system that can be used by the majority of users – those in the casual and less-confident category-- and is equitable.

The Plan identifies two parts: A and B. Part A is the ultimate vision desired and sets requirements for large capital projects and development. Part B is a plan that will get us the best connectivity possible as we work toward achieving Part A.

The Plan is flexible and has the ability to adjust as priorities and conditions change. It is based on nationally accepted principles and has been vetted through a process that was as inclusive as possible while taking into account physical constraints and user comfort.

## SUMMARY

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The Bothell Citywide Bike Plan is based on providing a safe, sustainable, and citywide network incorporating the two existing regional trails of Sammamish River Trail and the North Creek Trail as the main spine corridors.

The Plan envisions a citywide network that accommodates a wide range of users safely through the City's development standards, which will be implemented generally through capital roadway improvement projects and new development frontages. This network will offer appropriate levels of safety and comfort for bicyclists based on the latest bike standards and recommendations.

The focus of this initial major rework of the draft Plan is on developing the network. Future work may potentially include elements such as education and encouragement and additional capital items such as wayfinding signage and storage.

In developing the Plan, it was recognized that the City could not afford to build its ultimate vision with available resources within a reasonable time period. As an illustrative example of the cost, if a street has more pavement currently than necessary (such as more traffic lanes or wide shoulders) it may be possible to create bike facilities simply by removing lanes and/or restriping. This is relatively inexpensive. However, in many cases, there are only a single, narrow vehicular lane in each direction and no extra pavement or right-of-way with which to simply add a bike facility. In this case, the project would need to move curbs/gutters/storm drains, planters, and sidewalks to accommodate the bike lane. This becomes quite expensive. Essentially, on par with a large road widening project.



Part A of the Plan identifies the ultimate bike facility network. As private redevelopment occurs and large road projects occur, this is the standard to which these facilities will be built. Due to financial constraint, it is anticipated that completion of this system will be incremental and take time to occur. For example, if a private property along 228<sup>th</sup> St SE redevelops, it will be required to redo its frontage to provide a 5' protected bike lane. But this will occur only along its frontage.

If the City can find additional funds, priority bike projects could occur that result in the ultimate bike facility along a corridor at an earlier time.

Recognizing that the ultimate vision will take time and significant resources to be realized, the Plan proposes to complete as much of the existing network within a 25-year period as possible by filling in gaps in the existing bike corridors.

Part B of the Plan will fund projects to fill in existing gaps in the identified bike network to provide as much connectivity as soon as possible. In many cases, the result will not be the envisioned, ultimate bike facility but it will meet minimum standards. These projects will be funded by City funds and grants and will occur over a 25-year period.

Example: While the ultimate bike facility for 228<sup>th</sup> St SE is a protected bike lane in each direction, much of the corridor has a 5' on-street bike lane. The City could fund missing gaps along this corridor to install 5' protected bike lanes to provide a complete bike corridor.

In summary, the Plan has been developed in such a way as to make it extremely flexible without losing sight of the ultimate vision. Elements of the Plan can be implemented as quickly as resources become available.

# 1 INTRODUCTION

The City of Bothell's location is a crossroads at the northern end of Lake Washington which makes it a gateway between King and Snohomish County for all modes of transportation from cars to buses to bikes. Bothell offers many opportunities for employment, education, and recreation. As a crossroads for transportation, its transition from a predominantly motorized vehicle-only suburban community to a multi-modal community is critical to ensure accessibility for residents and visitors of all ages and abilities. The Bothell Citywide Bike Plan will provide guidance for current and future generations to expand and encourage bike use for multi-modal connectivity. The Plan will be reassessed every few years to continue adding plan elements that will enhance and support the bike plan network and usage and refine the network as needed.

## BENEFITS OF BICYCLING

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Bicycling has consistently grown as a viable and sustainable mode of transportation and is becoming more prevalent than ever as system networks continue to provide more connectivity and safety. As bicycling grows in use, the benefits are becoming more apparent over time. Many cities are facing challenges in terms of economic development and growth, providing environmentally sustainable health and climate opportunities for residents and visitors, and equitable access to these opportunities for everyone. The bicycle is a key component of a sustainable transportation network. Cities across the country are encouraging bicycle use as a viable transportation option and a means to achieving multiple objectives, including economic development, providing transportation solutions to accommodate growth within and beyond city limits, improved public health and equity, and reducing environmental impacts.

### *Economic Development and Growth*

Investing in bicycle and pedestrian infrastructure is a key strategy for enhancing livable neighborhoods that encourage social interaction, increase personal safety, while reducing vehicle congestion. Providing transportation choices can give households the option of owning fewer cars, thus freeing up more household money that can be spent in the local economy.

Many regions and states as well as local municipalities have found that bicycle tourism supports local economic development due to spending by travelers along with bike-related businesses. With a scenic riverside route along the Sammamish River which provides connections to Lake Washington and the Eastside communities, Bothell has the potential to foster economic development through bicycle tourism and the *Begin at Bothell* Trip Planner Program.

The provision of non-motorized infrastructure assists in the revitalization and redevelopment of commercial centers. Employment centers that offer bicycle facilities along with other multi-modal transportation options as an alternative to drive-alone vehicles are offered as an employment benefit to recruit and attract potential employees.

The Canyon Park Regional Growth Center is expected to redevelop with higher densities of residents and employment as the region continues to grow. With congested roadways and ultimate buildout of existing right-of-ways, the ability to accommodate growth relies on transportation demand management (TDM) practices which include bicycle, pedestrian and transit mobility solutions. Cities cannot afford to build a roadway system that would meet the needs of continued growth if all commuters used single occupancy vehicles. TDM solutions that include the bicycle will provide multi-modal transportation options that the continued growth will require thereby benefiting the local economy.

#### *Health and Equity Benefits*

The Centers for Disease Control (CDC) and Prevention recommends 150 minutes of moderate intensity aerobic activity every week, which is equivalent to 10 minutes of brisk activity, whether biking or walking, 3 times a day, 5 days a week. Providing opportunities for people to integrate walking or biking into their daily routines can help them more easily meet these guidelines and stay healthy and fit.

Also, according to recent CDC information, the rates of obesity among children and adolescents age 2 to 19 remains a serious problem showing the prevalence of childhood obesity at about 17 percent. By providing safe and accessible neighborhood improvements, parents can integrate physical activity by walking or biking to school. Increasing the opportunities for physical and mental wellness can benefit all ages and abilities as well as economically challenged families.

The Bike Plan improvements will provide equity benefits through the connectivity of existing and future routes to reach areas that provide affordable housing and disadvantaged/low-income households. Developments and housing for multi-family, mobile homes, and public schools provide the best indicator of prioritizing to meet this benefit and is identified in the Bike Plan facility improvements criteria. These areas typically rely on other means of transportation other than a passenger vehicle. Connectivity through bike and walkways to transit or other mobility hubs is an important criteria for establishing the network to achieve equitable access for the un(der)served populations of Bothell. The City of Bothell has consistently invested in facilities such as the North Creek Trail and Downtown Bothell Multiway and Main Street Corridors to provide paired mobility options between motorized and non-motorized transportation modes.

#### *Environmental*

The environmental benefits provided from enhanced bicycle facilities will reduce greenhouse gas emissions by converting vehicle trips to solely non-motorized bike commute or recreational trips, or by encouraging mass transit use by providing accessibility to transit routes via bicycling. Expanding the bicycle network reduces congestion along major arterial routes which lowers the need to construct more traffic lanes and pavement over green spaces which lowers the surface runoff and contaminants to our streams and waterways.

## VISION AND GOALS

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### *Vision*

The Vision of the Plan is to provide a transportation network for bicyclists of all ages and abilities that will promote safe and accessible travel for commuters (including transit users) and recreational users based on the Level of Stress principles. The network builds upon the existing regional trail system, using the North Creek Trail and Sammamish River Trail as the spine of the network. This will create opportunities to access the trails and provide connections from them to transit facilities, recreation, education, employment, commercial centers, and other points of interest throughout the City of Bothell. The network will provide bicycle access opportunities for neighborhoods that will encourage use by casual and less confident riders, which make up the majority of users, by providing safe connections for multi-modal travel including bikes, pedestrians, transit, and motor vehicles.

Few agencies have the ability to create the desired bike network in a short period of time with the limited funds available to them. The vision is to create a Plan that provides flexibility for the City to move forward as quickly as it has the ability to provide resources toward its vision. Part A of the Plan sets the ultimate, state-of-the-art vision of the Bothell bicycle system. It relies on large-investment city projects and redevelopment to complete the network. If the City were to fund Part A solely through a Bike Program it is likely that the total cost would likely exceed the \$100,000,000 threshold. While this is daunting likely not achievable in the near future, it is important to keep and implement this vision to make it a reality. Part B of the Plan identifies improvements that can be made to fill in gaps and complete portions of the system in the most economical, practical, and prioritized manner. This would achieve the best connectivity as soon as possible. Projects identified in both Part A and B can be funded and implemented as the City desires. The Plan prioritizes projects to help make these decisions but, ultimately, it is up to the City to decide what kind of resources to allocate to the plan.

The two parts may overlap on any particular bike corridor. As an example, a particular corridor may have an existing 5' wide on-street, un-buffered bike lane along the majority of a 1-mile stretch. Based on stress level, the ultimate vision (Part A) is to provide a 2' wide buffer between the vehicular lane and the 5' wide bike lane. Doing so would require moving curbs/gutters, planters with trees, and sidewalks along 1-mile of road. This would be cost prohibitive in the near term. However, over the long term, due to the new Plan requirements and as road improvements and or private development occur, the bike lane will be converted incrementally to a buffered bike lane. In the nearer term (Part B), the City could pursue building the ultimate buffered bike lane in the few, short gaps where no bike lane currently exists. This would provide an unbroken 1-mile bike facility that, while most of it is a 5' bike lane, still provides a better measure of connectivity and safety than the existing condition.



### *Plan Goals*

The goals of the Plan are based on the goals established through community and City Council adoption of the *Imagine Bothell... Comprehensive Plan*.

- TR-G3: Support growth and vibrancy in commercial, educational, and employment areas through a transportation system that is inviting for all travel modes.
- TR-G4: Encourage walking, bicycling, ridesharing, and taking transit in order to reduce congestion and greenhouse gas emissions, improve mobility and overall public health, and improve mobility choices for people with special transportation needs.
- TR-G6: Create a transportation system that supports both fiscal and environmental sustainability.
- TR-G8: Prioritize transportation investments to support the development of the Canyon Park Regional Growth and Community Activity Centers, the Downtown Community Activity Center, the North Creek Regional Activity Center, and also other Community and Local Neighborhood Activity Centers.

The Plan has been coordinated with the following planning documents and projects:

- City of Bothell's Comprehensive Plan Transportation Element
- 2020 Canyon Park Subarea Plan Update
- Washington State Department of Transportation (WSDOT) I-405 Express Toll Lane Improvements Project
- University of Washington Bothell/Cascadia College (UWB/CC) Master Plan
- Sound Transit (ST) 145<sup>th</sup>/SR 522 Bus Rapid Transit (BRT) Plan
- Downtown Subarea Plan

The Plan also considers the following Puget Sound Regional Council (PSRC) Vision 2050 Equity-Related Policies:

#### Regional Collaboration

*MPP-RC-1* Coordinate planning efforts among jurisdictions, agencies, federally recognized tribes, ports and adjacent regions, where there are common borders or related regional issues, to facilitate a common vision.

*MPP-RC-2* Prioritize services and access to opportunity for people of color, people with low incomes, and historically underserved communities to ensure all people can attain the resources and opportunities to improve quality of life and address past inequities.

#### Environment

*MPP-En-4* Ensure that all residents of the region, regardless of race, social, or economic status, have clean air, clean water, and other elements of a healthy environment.

*MPP-En-15* Provide parks, trails, and open space within walking distance of urban residents. Prioritize historically underserved communities for open space improvements and investments.

#### Climate Change

*MPP-CC-8* Increase resilience by identifying and addressing the impacts of climate change and natural hazards on water, land, infrastructure, health, and the economy. Prioritize actions to protect the most vulnerable populations.

#### Transportation

*MPP-T-9* Implement transportation programs and projects that provide access to opportunities while preventing or mitigating negative impacts to people of color. People with low incomes, and people with special transportation needs.

*MPP-T-10* Ensure mobility choices for people with special transportation needs, including persons with disabilities, seniors, youth, and people with low incomes.

*MPP-T-28* Consider demand management alternatives as future growth needs are analyzed, recognizing capacity constraints at existing facilities and the time and resources necessary to build new ones.

The 2012 AASHTO Guide for the Development of Bicycle Facilities discusses the ways in which to classify different types of bike riders, including comfort levels, physical ability, and trip purpose. The AASHTO Guide classifies people willing to ride into two primary groups: Experienced/confident, and casual/less confident. It is the latter group that makes up the majority of potential bike riders which may include those that:

- Ride frequently for multiple purposes;
- Enjoy biking occasionally but may only ride on paths or low-traffic streets in favorable conditions;
- Ride for recreation, perhaps with children;
- Ride a bike as a necessary mode of transportation.

In order for this group to regularly choose biking when making mode choices, a physical network of visible, convenient, and well-designed bike facilities is needed.

The Plan goals are as follows:

**Connectivity** – Complete a network of low-stress on and off-street bicycle facilities.

**Safety** – Create and improve a bicycle network that is safe and inviting for bicyclists of all ages and abilities.

**Mode Share** – Increase bicycle use as a sustainable travel mode for commuting or recreational uses.

**Equity** – Provide equitable access to bicycling for all community members and equitable community impacts as a result of the implementation and construction of new facilities.

**Community** – Develop a strong bicycle community identity while advancing a culture of respect and responsibility for all transportation system users.

**Land Use Integration** – Link the bicycle network with key land uses and destinations.

**Feasibility** – The bicycle network will be developed in two parts to reflect the ultimate envisioned network (Part A), and a plan to improve the existing network by filling in gaps in the existing network as funding becomes available (Part B).

## PROCESS

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The Plan is intended to be a living document. The initial version focuses on identifying a network and the associated facility type for each segment. It identifies additional components of the Plan that will be addressed and included in the future. Through this process, the Plan will:

1. Create a long-term vision and then create a plan to implement it given realistic constraints
2. Create a network that works for the experience/confident group, but is also primarily focused on the casual/less confident rider that makes up the majority of users.

The Plan identifies challenges, opportunities, and recommended strategies for developing and maintaining a community-wide bike network. The Plan positions Bothell to make strategic, cost-effective investments in its bike network, to take advantage of funding and grant opportunities, and to guide regional and adjacent jurisdiction bike network improvements to raise the quality of life for Bothell residents and visitors. The Plan is flexible and is developed in a way that allows for easy modification to adjust to changing needs, schedules, and desires.

During the development process of the Bike Plan, the City of Bothell sought to:

- Gather community input on existing conditions, barriers and gaps within the current bike network, and priorities for improvements
- Build on existing and planned bike facilities and bike-friendly trails such as the North Creek and Sammamish River Trails
- Develop a Citywide bike network that includes arterial and neighborhood greenways connection routes
- Prioritize improvements to the bike network and develop a plan for implementation
- Identify additional components of the Bike Plan to discuss in the future such as education, encouragement, enforcement, evaluation, wayfinding, and bike storage for future inclusion.
- Gain community support by requesting input from the general public and a wide range of stakeholders.

The timeline for the development of this Plan occurred over the following phases:

**Initial Plan Development (2018 - 2019):** The City envisioned a multi-functional base network for bike use which was shared to the public for input, feedback, and investigation.

**Draft Plan Development (2020 - 2022):** Further refinements to the Plan including a detailed review of projects and cost estimates for implementing to fill in network gaps within the limited pavement conditions and right-of-way.

**Final Draft Plan Development (January 2022 – July 2022):** Final Bike Plan review internal City stakeholders, public outreach, and by City of Bothell Planning Commission with incorporation of revisions and program and policy recommendations.

**Final Plan Adoption (July 2022 - September 2022):** City Council review and adoption for inclusion into City of Bothell Comprehensive Plan.



## 2 EXISTING CONDITIONS

The City of Bothell's existing bicycle network has two regional shared-use trails (separated from roadways) that provide the primary cross-city spine bike facilities. These trails, the North Creek and Sammamish River Trails, serve as the main bicycle connection to the greater regional bike network and serve both commuter and recreational bike riders. The remaining existing network is comprised of primarily 5-foot standard bike lanes or shared-use lanes (where bikes share the roadway travel lane with cars) – all in various states of completion. There are only a few arterial corridors in the City that currently have bicycle facilities. The total length of existing bicycle lanes or signed bike routes within the Bothell City Limits is approximately 12 miles. [Map 1](#) shows the existing bike network system.

The Sammamish River Trail is an extension of the Seattle-based Burke-Gilman Trail and provides the primary east-west regional bike route adjacent to the scenic Sammamish River. The Sammamish River Trail connects Blyth Park to Bothell Landing and Downtown Bothell, and ultimately connects to the University of Washington Bothell/Cascadia College Campus (UWB/CC) and then heads towards the City of Woodinville. The Sammamish River Trail is owned and maintained by King County. While sections of this trail could be wider, it is complete – without gaps.

The North Creek Trail is the City's other primary regional bike route that provides north-south cross-town connectivity. The North Creek Trail begins from a trail head off the Sammamish River Trail just south of the UWB/CC campuses and east of the Downtown Bothell core. The North Creek Trail travels into and through the college campuses through an underpass at SR 522 and continues north towards the NE 195<sup>th</sup> Street and I-405 Interchange where it crosses I-405 and connects to the North Creek Business Park. From NE 195<sup>th</sup> Street, the shared use path route travels alongside North Creek until it crosses 228<sup>th</sup> Street SE and enters into the Canyon Park Regional Growth Center where it ultimately crosses Bothell-Everett Highway and terminates on SR 524 where it connects to the Snohomish County portion of the regional network. This trail has been worked on consistently over the last 10 to 15 years and is relatively complete. However, there remain a few gaps in the system and a large gravel portion that could be improved.

Some of the secondary bike network spine connections include Bothell Way/Bothell-Everett Highway (north-south route), 228<sup>th</sup> Street SE (east-west route), and Main Street/Beardslee Boulevard (east-west route). These corridors currently include standard bike lane facilities but are incomplete.

### REVIEW OF POLICIES AND PLANS

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#### *City of Bothell Comprehensive Plan*

The City of Bothell Comprehensive Plan was last adopted by City Council in 2015 and includes goals, plans, and policies that currently guide the development of bicycle facilities in the City (see Goals discussion above). The policies established in the Comprehensive Plan were considered as this Bike Plan was developed to adhere to the

fundamental goals and objectives identified through that process. The future Comprehensive Plan update will incorporate the new Bike Plan.

#### *City of Bothell Parks, Recreation and Open Space (PROS) Plan*

The City of Bothell Parks, Recreation, and Open Space (PROS) Plan was adopted by City Council in 2020. The PROS Plan includes goals, plans, and policies that will guide and enhance opportunities to encourage and provide for the health and high quality of life of Bothell residents with a diversified network of trails, parks, and open space. One of the goals of the plan is as follows:

*“Goal 2: Develop a network of shared-use trails and bicycle/pedestrian corridors to enable connectivity between parks, neighborhoods, commercial areas and other destinations.”*

*“The PROS Plan objectives align with this Bike Plan by: 1) Connecting the existing trail network to link and complete the city-wide regional trail system and to maximize pedestrian and bicycle access to the community, as funding allows; 2) Continuing to coordinate with nearby cities, King County and Snohomish County to support a connected trail network that provide continuous walking and biking access between parks and other key destinations; 3) Integrating the siting of proposed trail segments into the development review process; requiring development projects along designated trail routes to be designed to incorporate trail segments as part of the project; 4) Working with local agencies, utilities and private landholders to secure trail access and rights-of-way for open space, for trail connections; and 5) Providing trailhead accommodations, especially along major trail and walking routes, to include parking, wayfinding signage, benches, restrooms and other amenities.”*

The PROS objectives are common with the Bike Plan goals to develop a trail network with destinations in mind to serve the public need, provide safe connections, and be fiscally strategic and sustainable.

#### *City of Bothell Complete Streets Ordinance*

The City of Bothell adopted its Complete Streets Ordinance 2217 in September 2016 to ensure that the City includes active transportation measures and policies to advocate for a complete street approach when planning or designing street and roadway infrastructure. The City of Bothell has worked with the Community Transportation Association of the Northwest (CTANW) to apply and obtain State sponsored Complete Street Awards in 2017 and 2019 which provided funding for non-motorized travel improvements around the City.

#### *Adjacent Jurisdiction Agency Plans*

This section provides a summary of plans and policies related to the development of bicycle facilities and regional transportation in adjacent jurisdictions. The Plan was discussed with adjacent jurisdictions to coordinate with existing and future planned bike connections, particularly those with higher vehicular volume and travel speed roadways.

Snohomish County will provide the extension of the North Creek Trail north of SR 524 and potentially to the west via an extension of the 228<sup>th</sup> Street routes towards Lynnwood. On the east side of Bothell, the County plans a shared-use trail that will

connect 228<sup>th</sup> Street SE to SR 524 that parallels 39<sup>th</sup> Avenue SE to align with 42<sup>nd</sup>/43<sup>rd</sup> Avenue SE. The County also plans to include a potential east-west shared-use trail that parallels SR 524 on the south side and would connect to the north-south shared use trail described above from SR 524 at approximately its intersection with Bothell city limits.

Connections to the City of Kirkland will primarily occur through the Waynita Way/100<sup>th</sup> Avenue NE route facilities and potential future neighborhood greenways that would parallel Juanita-Woodinville Way to the Brickyard Park and Ride. The neighborhood greenways planned could potentially connect NE 145<sup>th</sup> Street to the Park and Ride on the south side of Juanita-Woodinville Way.

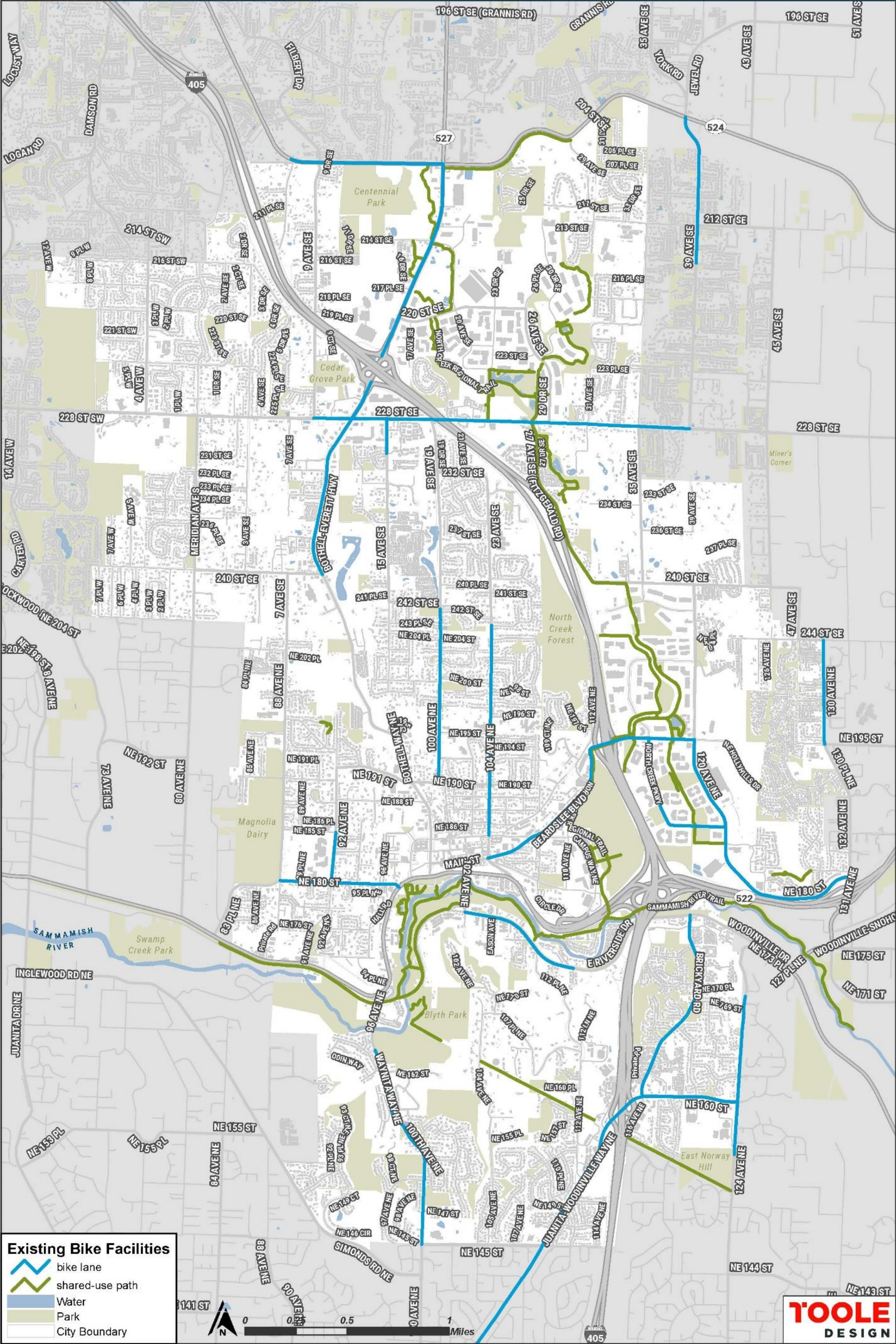
The City of Kenmore bike plan includes connections to 80<sup>th</sup> Avenue NE/Meridian Avenue and potentially NE 180<sup>th</sup> Street. The 80<sup>th</sup> Avenue NE connection will link to the City of Bothell at approximately NE 203<sup>rd</sup> Street which then provides access to the Bothell-Everett Highway to the east and to 228<sup>th</sup> Street SE to the north. The City of Kenmore also has plans for an extension of NE 185<sup>th</sup> Street from Kenmore eastward through a shared use trail network that could potentially connect to NE 180<sup>th</sup> Street that could parallel the Burke Gilman Trail but on the north side of Bothell Way.

Connections to the City of Woodinville to the east of Bothell are still under development by the City of Woodinville and would likely include the Sammamish River Trail, East Riverside/Woodinville Drive, NE 195<sup>th</sup> Street and 132<sup>nd</sup>/131<sup>st</sup> Avenue NE. The connections to Woodinville are significant in terms of reaching and connecting to the *Cross Kirkland Corridor Trail* and regional *Eastrail* network system which would ultimately extend from the City of Snohomish to Renton.





# Bothell Citywide Bicycle Plan





### 3 CRASH ANALYSIS

Historic crash data provided by the Washington State Department of Transportation was reviewed for the City of Bothell over the period from January 2016 to July 2021. A total of 20 crashes involving a bicycle were recorded during this evaluation period, or an average of 4 per year Citywide.

Of the 20 crashes recorded, 9 occurred in the morning (AM) and 11 in the evening (PM). Only two corridors had more than one crash (SR 522 and 228<sup>th</sup> Street SE), but not at repeat locations on either corridor. All but one crash occurred at either an intersection or driveway intersecting the adjacent roadway on a clear dry day, which indicates that bike awareness at these locations along with adequate facilities should be carefully designed to maximize visibility of bicyclists and safety.

Out of the 20 crashes reported, 3 had no apparent injuries, 2 had possible injuries, 11 had minor injuries, and 4 had serious injuries. There were no fatalities reported as a result of any of the reported crashes.

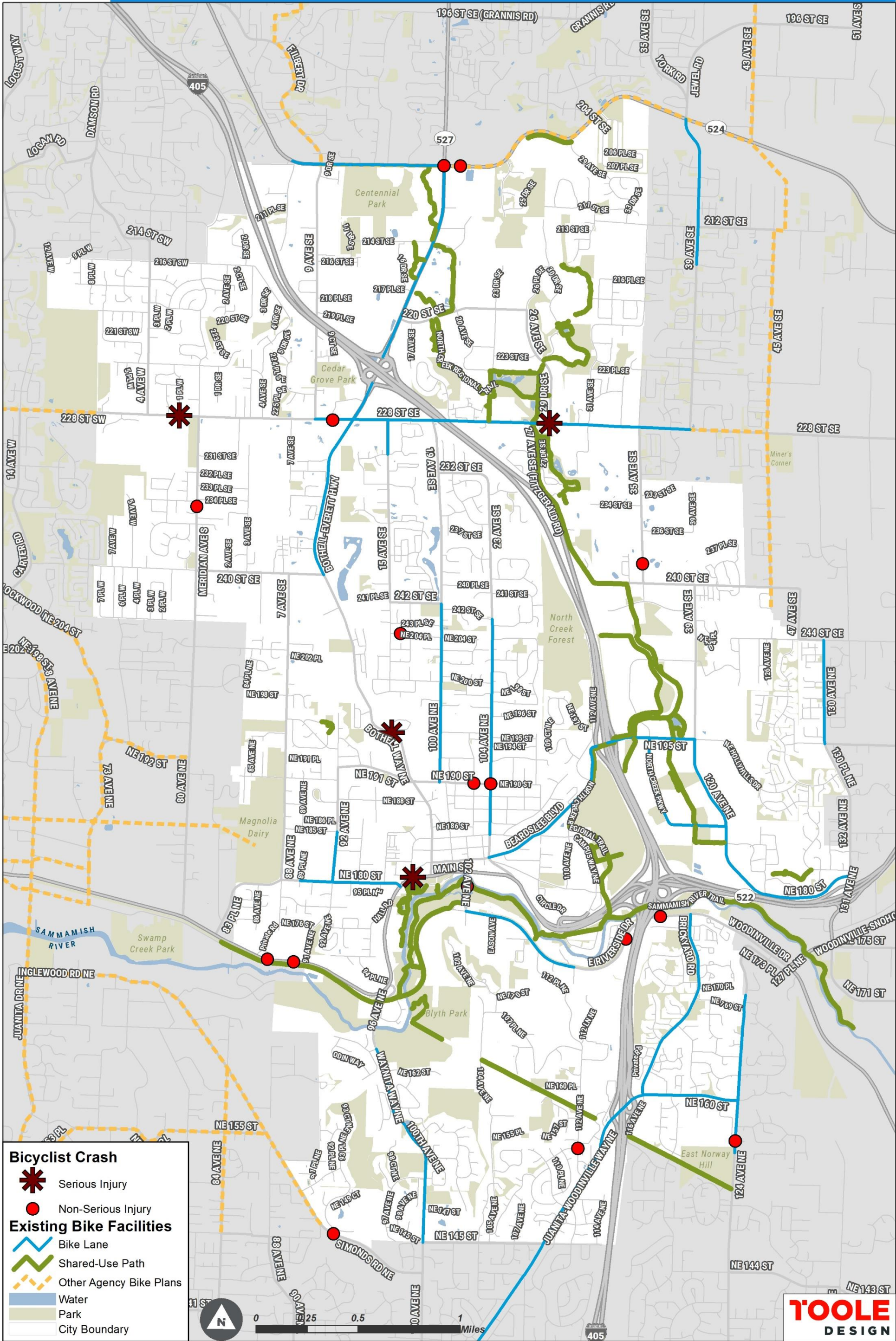
Crash data along the City trail system is not recorded unless reported to the Police Department for legal reasons. No crashes along trails have been reported in the past recent history and generally single bike crashes are not reported.

**Map 2** shows the location and severity of the 20 reported crashes on City streets during the 2016 to 2021 reporting period.





# Bothell Citywide Bicycle Plan





## 4 PUBLIC ENGAGEMENT

The City of Bothell staff conducted an initial public outreach to obtain feedback and input to the basic Bike Plan network development approach. No specific facility improvements were identified at the time with the exception of defining the general function of the major and established corridor bike connections. The basic concepts of the Bike Plan were described to show how the two regional trails would be used as the main spine of the east-west and north-south bike corridors, and that the roadway arterials leading to the two trails would be the secondary connections followed by collector and local streets for neighborhood bike connections.

The City of Bothell residents have shown strong community support for a bike network that can be used by riders of all ages and abilities. This was expressed during initial public outreach efforts which are described in the sections following.

The initial public outreach consisted of two public open house meetings held in September 2018 at two different locations. The south end meeting was held at City Hall and the north end meeting was held at Frank Love Elementary School. Approximately 60 attendees from both meetings identified the following Bike Plan elements in order of highest importance with the number of respondents as follows:

1. A network that serves people for all ages (26)
2. Bikeways that connect to schools, parks, and trails (25)
3. Bikeways that connect to commercial areas (23)
4. Support infrastructure (such as bike share, bike parking, and wayfinding) (14)
5. Quick and low cost bike project improvements (10)
6. High quality and high comfort bike improvements (10)
7. Bikeways in neighborhoods (7)
8. Bike Support Programs (such as bike share education and enforcement) (7)

In addition to the above responses, attendees also prepared and submitted individual comments regarding specific new connections to close gaps or new routes in general, maintenance issues on existing facilities, wayfinding information and access, specific barriers to their bike routes, and approval of specific elements of the draft bike plan improvements among others.

## 5 NETWORK RECOMMENDATIONS

The network recommendations developed for the Bothell Citywide Bike Plan are precedent on providing a bicycle network that feeds the spine system and connects to neighboring agencies' and regional systems. The proposed bike facilities connecting neighborhoods and centers were identified along either City arterials, or signed neighborhood greenways and local streets. The type of bike facility along the arterial system were then determined using a Level of Traffic Stress (LTS) evaluation to provide for a safe and comfortable route for users of all ages and abilities. The LTS evaluation is described in the following sections.

## CHALLENGES

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The City of Bothell's natural and physical man-made barriers make the development of a grid-based system a challenge for all transportation modes. Bothell's topography is made up of a series of hills with steep slopes that are sensitive to reconstruction and development. They include in general locale, Norway Hill, West Hill, Maywood/Beckstrom Hill, Bloomberg/Pioneer/Holly Hills, Queensborough (Nike) Hill, Waynita, and Canyon Creek.

Other barriers include: 1) The Sammamish River which minimizes access to the areas south of downtown Bothell and 2) The North Creek Levees upon which the North Creek Trail currently is built to provide access for the area adjacent to North Creek. The levee was built on a limited weight design which does not allow for further widening or paving without substantial costs.

The most challenging man-made physical barrier for bicycle travel is the I-405 freeway which bisects the city north and south primarily in the Snohomish County section of Bothell. The other primary roadways that present crossing challenges are the Bothell-Everett Highway (SR 527) and Bothell Way (SR 522). Both of these corridors are multi-lane highways with over 20,000 vehicles per day and average speeds of 35+ miles per hour. Signalized intersections are also generally spaced beyond a quarter mile and bike routing needs to occur at the closest signalized location.

Another challenge is the substantial cost of adding bike infrastructure. The majority of Bothell's street infrastructure have minimum pavement width, lane widths, and are not multi-lane facilities. Adding bike facilities will, therefore, require adding pavement and associated stormwater treatment and moving curbs, gutters, sidewalk and planters. This is as opposed to narrowing travel lanes or eliminating vehicular lanes to obtain sufficient space for bike facilities.

Finally, funding for bike improvements is limited from a local resource and grant availability perspective compared to the system need. Therefore, bike plan improvements and projects must be strategically prioritized and implemented to obtain the best cost and service benefit.

## OPPORTUNITIES

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Bothell is fortunate to have relatively complete north-south and east-west regional shared-use facilities. The development of Bothell's Bike Plan is predicated on the use of two major regional trails that provide cross town accessibility. The Sammamish River Trail and the North Creek Trail are both shared-use paths that act as the bicycle freeway system of the bike network. The Sammamish River Trail is a completed trail that serves east-west connectivity just south of Downtown Bothell from Kenmore to Woodinville. The North Creek Trail is approximately 90 percent complete with some gaps in the Canyon Park Business Park area and updates required on sections such as the I-405 overcrossing and some of the gravel levee sections in the North Creek Business

Park -- both of which are not wide enough to meet shared use trail compliance requirements but are constrained to levee requirements.

The Bothell Way Corridor from the northern end of the multiway segment in Downtown to 240<sup>th</sup> Street SE is currently in the design phase to be widened from a two lane section to a four or five lane section that will ultimately include protected bike lanes on both sides of the roadway from Reder Way to 240<sup>th</sup> St SE. This will provide a much needed, continuous, and safe pedestrian and bike facility between Downtown and the Canyon Park area. This will serve as a secondary north-south spine.

The first phase of the Washington State Department of Transportation I-405 Express Toll Lane project will provide vehicular access to the north of I-405 at 17<sup>th</sup> Ave SE. The second phase will ultimately extend over the southbound lanes as well and provide a bike connection from the Canyon Park Business Park to 228 Street SE retail center portion of the Regional Growth Center.

Many parts of the City of Bothell's existing bike network have short gaps or wide shoulder sections that were started by developer projects and will need some minor improvements to complete the bike corridor. Although these sections may not be of the highest priority for the overall bike network, they may be the easiest opportunities to complete to close gaps for a continuous route.

## **THE PLAN**

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As the development of specific improvements for bike corridors were determined based on available infrastructure such as existing roadway pavement widths, available right-of-way, and connections to existing facilities, it was clear that the recommended Bike Plan improvements would need to be developed in two separate parts: Part A - A network that reflects Bothell's vision that will be completed by 1) private development, 2) as part of larger roadway improvement projects and, 3) as a standalone large bike project, and Part B - A prioritized list of projects that will fill in gaps in the existing network using an annual budget. Part B will also eventually include other elements of the Bike Plan such as education, storage facilities, and wayfinding. This approach results in a plan that is financially feasible to implement, embraces the ultimate bike network vision, and is flexible to be able to adjust to changing economic environments and priorities.

## **PART A**

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Part A of the Plan identifies the ultimate bike facility network. The bike network improvements identified for the ultimate Part A facilities considered how the various sections connected to the overall network, but also considered corridor characteristics such as traffic volumes, pavement widths, and vehicular travel speed. These characteristics are evaluated collectively as the *Level of Traffic Stress* (LTS) which is further described in the following section.

## DEVELOPING A NETWORK FOR ALL AGES AND ABILITIES

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To develop a network that will serve the widest possible segment of the public who currently is or would like to ride a bicycle, the proposed bike network emphasizes “high comfort” bicycle facilities. To measure the comfort and perceived safety of riding a bicycle throughout Bothell, a Level of Traffic Stress (LTS) analysis was conducted by City of Bothell staff to classify streets based on their stress level for bicyclists.

The results from the Level of Traffic Stress (LTS) analysis were analyzed in order to identify roads that currently provide a lower-stress bicycling experience and higher-stress roads that require additional infrastructure for such an experience. Trails and protected bike lanes are typically classified as low-stress/high comfort facilities while major arterials are often high-stress/low comfort. This stress classification is important because people have different levels of comfort interacting with motor vehicle traffic when they are bicycling or considering bicycling. The primary objective in analyzing the LTS network is to identify high-stress roads that contribute to a disconnected network and identify what treatment types or designs can be implemented to improve comfort. The goal is to create a network that conveniently connects people to destinations using only high-comfort routes.

## BICYCLE LEVEL OF TRAFFIC STRESS ANALYSIS

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To determine the bike facility network types that could be implemented to provide a safe and comfortable system that can be used by a wide variety of bicyclists, a review of the *Level of Traffic Stress* (LTS) for the City bike network was based on the Mineta Transportation Institute Report, *Low-Stress Bicycling and Network Connectivity*, May 2012, guidelines which considers existing roadway characteristics such as speed limits, the amount of motor vehicle traffic, the number of travel lanes, bikeway, and on-street parking characteristics. This source report is the nationally accepted practice and methodology from which other reports are generally based on. For more information about the LTS analysis, the Mineta Transportation Institute’s *Low-Stress Bicycling and Network Connectivity* study, shown in **Table 1** below, explains the four levels of LTS categories for on-street facilities.

The LTS analysis indicates roadway conditions that are considered appropriate for people of all ages and abilities, which should accommodate the majority of the population, particularly the “interested but concerned” population (**see Figure 1**). Interested but concerned bicyclists are people who would like to ride a bicycle but are uncomfortable riding along stressful roadways, are less comfortable riding along conventional bike lanes, and are more inclined to ride on the sidewalk or not make a trip by bicycle if the route is too stressful. This group comprises roughly 51-56 percent of



the population<sup>1</sup>. Providing low-stress bike facilities that increase separation between motor vehicles and bicyclists, increases predictability of travel conditions such as, slow motor vehicle speeds and volumes, and provide safe and convenient connections to destinations is paramount in creating a successful all ages and abilities bicycle network.

Research on the types of bicyclists indicates that while highly confident bicyclists are accustomed to interacting with motor vehicle traffic, most people have little tolerance for interacting with traffic while bicycling and are very worried about being struck by a motor vehicle. In fact, these concerns discourage many people from trying bicycling in the first place. The “interested but concerned” bicyclists prefer quiet streets, trails, and other "low-stress" places to bike that have limited motor vehicle traffic or are separated from traffic.

The results of the City of Bothell LTS analysis are displayed in Map 3. The majority of major streets are considered high-stress (LTS 3 and LTS 4). Major streets that are considered low-stress typically have a striped bike lane or wide shoulder with lower posted speed limits. Many of the streets that currently have a striped bike lane or paved shoulder are considered high-stress. Nearly all neighborhood or local roads are low-stress, however, these low-stress streets are disconnected to most destinations or other low-stress routes. These gaps between low-stress routes and destinations either discourage people from riding a bike or require people who are more confident to ride along high-stress routes.

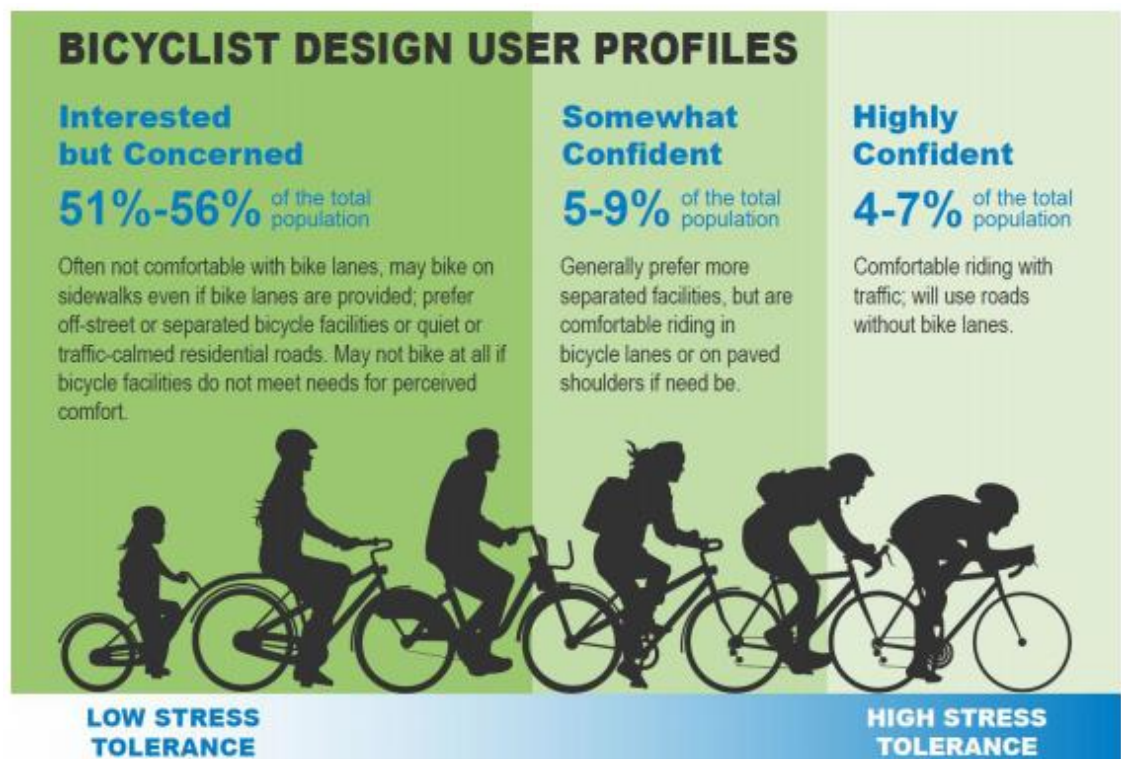
Table 1: LTS Chart, From Low-Stress Bicycling and Network Connectivity

LTS	LTS DESCRIPTION
<b>LTS 1 Highest comfort</b>	Presenting little traffic stress and demanding little attention from cyclists, and attractive enough for a relaxing bike ride. Suitable for almost all cyclists, including children trained to safely cross intersections. On links, cyclists are either physically separated from traffic, or are in an exclusive bicycling zone next to a slow traffic stream with no more than one lane per direction or are on a shared road where they interact with only occasional motor vehicles (as opposed to a stream of traffic) with a low speed differential. Where cyclists ride alongside a parking lane, they have ample operating space outside the zone into which car doors are opened. Intersections are easy to approach and cross.
<b>LTS 2</b>	Presenting little traffic stress and therefore suitable to most adult cyclists but demanding more attention than might be expected from children. On links, cyclists are either physically separated from traffic, or are in an exclusive bicycling zone next to a well-confined traffic stream with adequate clearance from a parking lane or are on a shared road where they interact with only occasional motor vehicles (as opposed to a stream of traffic) with a low speed differential. Where

• <sup>1</sup> Jennifer Dill and Nathan McNeil, “Four Types of Cyclists? Examination of Typology for Better Understanding of Bicycling Behavior and Potential,” Transportation Research Record: Journal of the Transportation Research Board, 2387: 129-138, 2013.

	a bike lane lies between a through lane and a right turn lane, it is configured to give cyclists unambiguous priority where cars cross the bike lane and to keep car speed in the right-turn lane comparable to bicycling speeds. Crossings are not difficult for most adults.
<b>LTS 3</b>	More traffic stress than LTS 2, yet markedly less than the stress of integrating with multilane traffic, and therefore welcome to many people currently riding bikes in American cities. Offering cyclists either an exclusive riding zone (lane) next to moderate-speed traffic or shared lanes on streets that are not multilane and have moderately low speed. Crossings may be longer or across higher-speed roads than allowed by LTS 2 but are still considered acceptably safe to most adult pedestrians.
<b>LTS 4: Lowest comfort</b>	A level of stress beyond LTS3. This stress level is considered acceptable by over a small share of people who are comfortable riding a bike with higher traffic speeds, high vehicle volume, and little to no separation from moving traffic.

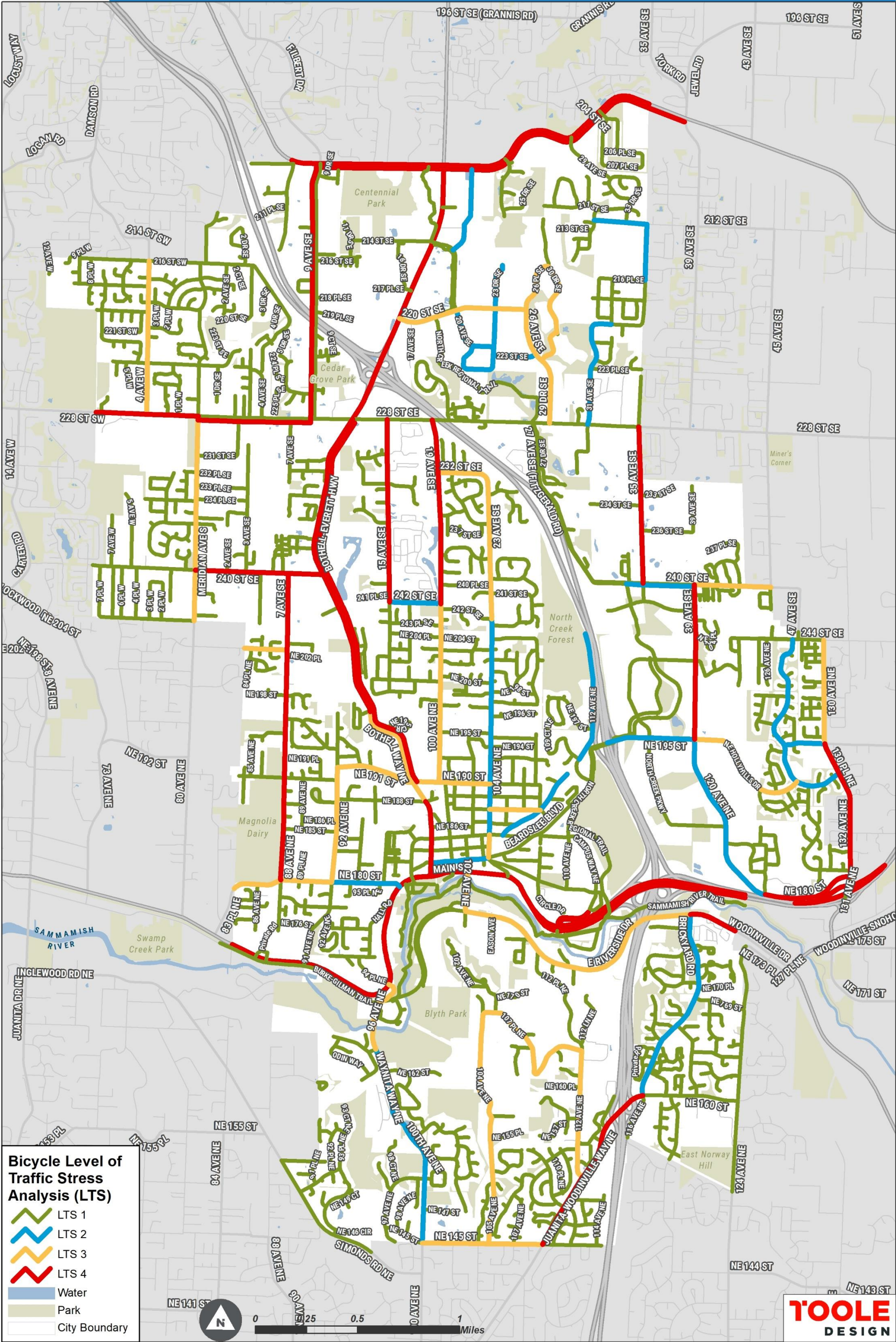
Figure 1: Bicyclist Design User Profiles, FHWA Bikeway Selection Guide







# Bothell Citywide Bicycle Plan



**Bicycle Level of Traffic Stress Analysis (LTS)**

- LTS 1
- LTS 2
- LTS 3
- LTS 4
- Water
- Park
- City Boundary



LTS analysis was conducted by the City of Bothell.



## RECOMMENDED FACILITY TYPES

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The City of Bothell Citywide Bike Plan recommends a variety of bike facility types that range from neighborhood greenway to protected bike lanes and new shared-use paths. The facilities recommendations proposed in this plan have been chosen based on existing roadway conditions related to number of vehicle lanes, posted speed limits, traffic volumes, right-of-way constraints, development opportunities, funding constraints, and the results from the LTS analysis.

The LTS analysis was a significant factor in selecting bicycle facilities for the ultimate configuration for Part A bike facilities. For wider streets with high speed and traffic volumes, facilities that provide a greater degree of separation from moving traffic are proposed. These facilities include shared use paths, protected bike lanes, and buffered bike lanes. For streets that have moderately lower traffic speeds and volumes, bike lanes were selected. For streets with lower traffic speeds and volumes, neighborhood greenways were selected.

Intersection treatments that could be implemented for new projects need further review for specific locations. The specific intersection treatments determined at the design phase for each project is based on intersection conditions such as geometry and traffic volumes. Intersection treatments are important to the bikeway network operation because these are locations in the network where there tends to be more conflict between users, and a tendency to discontinue bikeways due to lack of space or other operational constraints.

The following page provides definitions for each facility type, example photos, and how the facility fits within the spectrum of Level of Traffic Stress.

## BOTHELL'S ROADWAY NETWORK: CONNECTIVITY AND THE ROLE OF SPEED

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The layout of Bothell's roadway network provides limited opportunities for through routes, no matter the mode of travel. As a result, there is little opportunity for routing bicyclists on less busy roads that would provide a low-stress experience. The major corridors for vehicles must also serve the needs of bicyclists. **Table 2** identifies local examples for different LTS levels on existing facilities within Bothell's network and how LTS can be decreased to create a more comfortable biking network for a AAA network.

Higher vehicle speeds have been shown to be the most detrimental factor in the safety of bicyclists and pedestrians. To mitigate stress for bicycle riders, the Plan's improvements propose facilities that create space or barriers along higher speed roadways, or by providing dedicated facilities such as bike lanes or raising driver awareness with sharrows markings and signage where lower travel speeds and traffic volumes are more manageable.

**Table 2: Local LTS Examples**

<b>LTS</b>	<b>ROADWAY CHARACTERISTICS</b>	<b>EXAMPLE FACILITY</b>	<b>LOCAL EXAMPLE</b>	<b>POTENTIAL UPGRADE TO BOOST LTS LEVEL</b>
<b>LTS 1 Highest comfort</b>	Physically separated bikeways	Shared use path	North Creek Trail, Sammamish River Trail	Complete remaining gaps, provide alternate to narrow gravel sections, and improve crossings
<b>LTS 2</b>	Low volume, low speed street	Shared lane on a local street	104th Ave NE 242 <sup>nd</sup> St SE- west of 19 <sup>th</sup> Ave SE	Traffic calming Dedicated space for bicyclists (if needed, depending on context)
<b>LTS 3</b>	Higher-speed, multilane roadway with no separation between travel lanes and bike facilities	Bike lane or striped shoulder with higher traffic speeds or shared lanes on moderate speed streets that are not multilane	Beardslee Blvd (30 mph) 100 <sup>th</sup> and 104 <sup>th</sup> Ave NE Meridian Ave	Separation from travel lanes (additional space or barrier) Narrower travel lanes Fewer travel lanes Bicycle facilities through intersections
<b>LTS 4: Lowest comfort</b>	Mixed traffic (no dedicated bike facilities)	High-speed, multilane roadway with no dedicated space for bikes	228 <sup>th</sup> St SE- west of 208 <sup>th</sup> St/SR 524 Bothell Everett Hwy- south of 228 <sup>th</sup> St SE	Dedicated space of bikes, separated separation from travel lanes (additional space or barrier) Narrower travel lanes Fewer travel lanes Bicycle facilities through intersections

## Bicycle Facilities

## Level of Traffic Stress by Facility



### Shared Use Path

- Physically separated from motor vehicle traffic
- Comfortable for a wide range of users
- Provides connectivity to on-street bicycle network
- May not serve all destinations directly

### Level 1 Most Separated

- All Ages and Abilities



### Separated Bike Lane

- Provides bike-only facility physically separated from automobile travel lane and distinct from sidewalk
- Separated from traffic by curb, bollards, planters, parked cars and/or other vertical elements
- Appropriate on medium- and high-volume streets

### Level 2

- Interested but Concerned Bicyclists



### Buffered Bike Lane

- Increases riding space and comfort by adding a painted buffer to a standard bike lane
- Buffer located either between the bike lane and automobile travel lane, or between bike lane and parking
- Appropriate on medium- to high-volume streets

### Level 2/3

- Interested but Concerned Bicyclists
- Somewhat Confident Bicyclists



### Bike Lane/ Shoulder Bikeway

- Marks dedicated space for bicyclists on the street with pavement markings
- Appropriate on medium- or low-volume streets

### Level 2/3

- Somewhat Confident Bicyclists



### Shared-Lane Marking

- Shows both bicyclists and drivers where bicyclists should ride on street for safe travel
- Reinforces that bicyclists belong in the lane and drivers must share the road
- Appropriate on low- and medium-volume streets where bicycle lanes cannot be accommodated

### Level 3 Least Separated

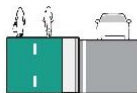
- Highly Confident Bicyclists

### Level 4 No Facility



#### MOST SEPARATED

Shared Used Path  
LTS: Level 1  
All Ages and Abilities



#### Separated Bike Lane

LTS: Level 2  
Interested but Concerned



#### Buffered Bike Lane

LTS: Level 2/3  
Interested but Concerned &  
Somewhat Confident Bicyclists



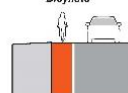
#### Bike Lane

LTS: Level 2/3  
Somewhat Confident Bicyclists



#### Shoulder Bikeway

LTS: Level 2/3  
Somewhat Confident Bicyclists



#### LEAST SEPARATED

Shared-Lane Marking  
LTS: Level 3  
Highly Confident Bicyclists





## HOW PART A GETS BUILT

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As private redevelopment occurs and large road projects occur, this is the standard to which these facilities will be built. Part A will be accomplished largely through redevelopment and large road projects. Part A will also include a few, large standalone bike facility projects. Due to financial constraints, it is anticipated that completion of this system will be incremental and occur over an even longer time period than 25-years.

In Part A, private redevelopment can provide the ultimate envisioned bike facility across the frontage of the redeveloped parcel. This provides incremental completion and is not predictable and consistent in timing. The City periodically undertakes large road improvement projects that can include the ultimate envisioned bike facility. As an example of how private development would help in development of the Bike Plan, if a private property along 228<sup>th</sup> St SE redevelops, it will be required to redo its frontage to provide a 5' protected bike lane. But this will occur only along its frontage.

Bothell Way NE/Bothell-Everett Highway Widening (between Reder Way and 240<sup>th</sup> St SE) project is an example of a large road widening project where an identified bike facility will be included with the project. The road project (\$55 million) will build a protected bike facility in the next 10 years.

Finally, there is a list of a few large, standalone bike projects that are recommended to be completed as resources become available. Generally, the cost of the total overall Part A network was not estimated due to the magnitude and unknown timing of implementation. Costs for the proposed standalone bike projects have been included when available.

## PART A: LARGE TRANSPORTATION PROJECTS WITH BIKE FACILITIES

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To date, the following facilities are anticipated to be completed as part of larger transportation projects.

In Design:

- Protected bike lanes on Bothell Way NE and Bothell-Everett Hwy from Reder Way to 240<sup>th</sup> St SE. This will be accomplished by project T74: Bothell Way NE/BEH Widening Project
- Protected bike lane NB and 5' on-road bike lane SB on 17<sup>th</sup> Ave SE from CT park and ride to 220<sup>th</sup> St SE via the WSDOT Express Toll Lane Project
- Protected bike lane on 228<sup>th</sup> St SE EB and WB From 35<sup>th</sup> Ave SE to 39<sup>th</sup> Ave SE as part of the 228<sup>th</sup> St SE Widening project

Under Construction:

- Shared-Use Trail on south side of SR 524 from 9<sup>th</sup> Ave SE to North Creek Trail near SR 527. Standalone project that is currently 85% funded.

Planned (Comprehensive Plan, Transportation Needs List, Other agency plans):

- 5' bike lane from 228<sup>th</sup> St SE to CT Park and Ride over I-405. Part of planned direct access ramp from south to I-405 by WSDOT in future.
- 9<sup>th</sup> Ave SE Widening with protected bike lanes
- Sammamish River Bridge Replacement
- Beardslee Blvd Widening (NE 185<sup>th</sup> St to 110<sup>th</sup> Ave NE). Likely completed via UWB and private development.
- 35<sup>th</sup> Ave SE Widening (228<sup>th</sup> St SE to 240<sup>th</sup> St SE)
- 20<sup>th</sup> Ave NE Extension
- 214<sup>th</sup> St SE Extension

## **PART A: STANDALONE BIKE PROJECTS**

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Projects that the City should fund as standalone projects are as follows. These projects may be competitive for non-motorized grant funding:

- North Creek Trail along 220<sup>th</sup> Street SE on north side of roadway
- Pedestrian/Bike Bridge across the Sammamish River near Brickyard Road/Woodinville Way intersection
- 26<sup>th</sup> Ave SE and 29<sup>th</sup> Ave SE Rechannelization
- Connection trail from North Creek Parkway South to the SR 522/I405 transit hub
- East Riverside Drive Trail
- 228<sup>th</sup> Street SE within City limits

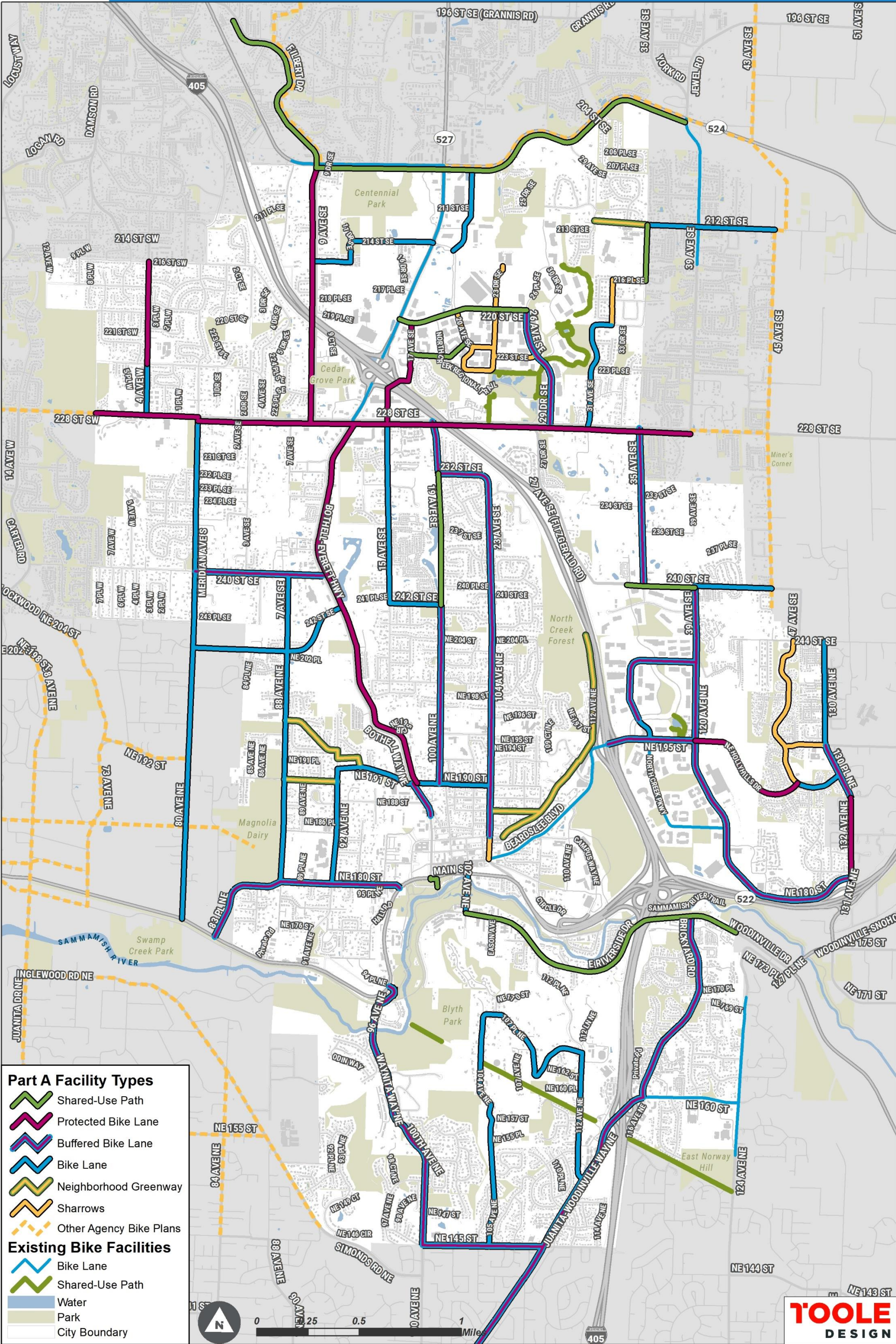
Proposed shared use trails identified as Part A projects are developed on one side of a roadway for dual direction bike travel. The proposed shared use trails within the City and the side of the road they are planned for implementation are listed below:

- 35<sup>th</sup> Ave NE from 212<sup>th</sup> St SE to 216<sup>th</sup> St SE – West Side
- 220<sup>th</sup> St SE from SR 527 to 26<sup>th</sup> Ave SE – North Side
- 19<sup>th</sup> Ave SE from 232<sup>nd</sup> St SE to 242<sup>nd</sup> St SE – West Side
- East Riverside Dr from 102<sup>nd</sup> Ave NE to East City Limit – North Side





# Bothell Citywide Bicycle Plan





## **PART B**

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Part B will rely on City funds specifically allocated for the Bike Program plus bike grants to accomplish this work over a 25-year period. This work will be in addition to facilities built via Part A. With limited funds, what will be accomplished will have to be prioritized. The goal of Part B will be to connect the existing network as best as possible to fill in gaps in the existing system as best as possible.

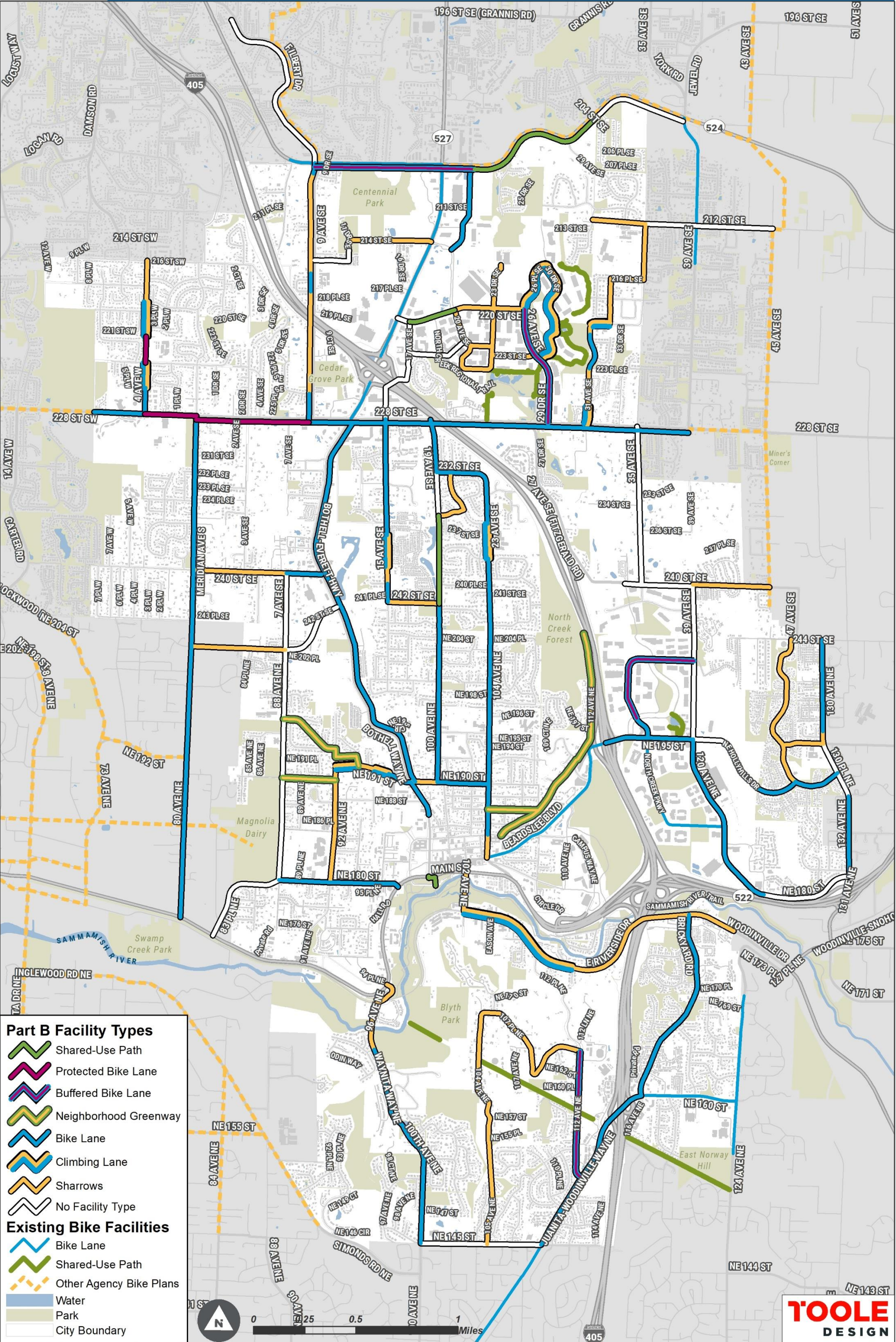
In many cases, the result will not be the envisioned, ultimate bike facility but it will meet minimum standards. The projects have been prioritized into a three-tier system. The draft Plan assumes at least Tier 1 (highest recommended priority) is built in the initial 25-year period. This can be modified as desired based on the availability of City resources. Example: While the ultimate bike facility for 228<sup>th</sup> St SE is a protected bike lane in each direction, much of the corridor has a 5' on-street bike lane. The City could fund missing gaps along this corridor to install at least 5' protected bike lanes to provide a complete bike corridor – most of which will be the existing 5' on-street bike lanes.

If the City can find additional funds, priority bike projects could occur that result in the ultimate bike facility along a corridor at an earlier time.





# Bothell Citywide Bicycle Plan



Proposed Part B facilities are the short-term configuration. The proposed Part A facilities are the long-term configuration that will be implemented as funding becomes available.





## AVAILABLE RESOURCES AND PHASED SOLUTIONS

Wherever possible, recommendations focus on the use of existing paved width to accommodate bicycle facilities. This approach is not only cost-effective, but also provides an opportunity for the City to increase safety for all roadway users by reducing speeds and narrowing travel lanes. Where using the existing pavement width was not an option or would have resulted in a less than ideal bicycle facility, interim and long-term solutions have been identified.

**Table 3** provides a high-level explanation of the types of facilities that are recommended, as well as simple design assumptions and considerations implementing lower stress bicycle facilities. The photos and diagrams following Table 3 provide additional details for each bike facility or treatment type that could be used for common scenarios in the City of Bothell.

**Table 3. Facility Definitions and Design Assumptions**

FACILITY	DESIGN ASSUMPTIONS	CONSIDERATIONS FOR LOWER STRESS BICYCLE FACILITIES
<b>Shared use path (SUP)</b>	10'-12' min width, max. grade 5%	Can be narrower in constrained situations. Shared-use paths located closely to a roadway or has a higher number of driveways and intersection crossings require higher level of design considerations to ensure safe and comfortable travel.
<b>Bike lanes (BL)</b>	5' min. width (one way in each directional)	Not comfortable for many bicyclists on moderate to high-speed, multi-lane roadways
<b>Buffered bike lane (BFBL)</b>	5' min. with 2' min. striped buffer	Appropriate on moderate speed roadways; easy to add separation in key locations
<b>Separated bike lanes (SBL), also called protected bike lanes and cycle tracks</b>	5' min. each direction. Options include: a sidewalk level 5' asphalt path between the sidewalk and landscape strip.	Provides highest level of comfort for on-street facilities, especially on streets with moderate to high traffic speeds and volumes. Driveways and intersections require higher level of design
<b>Shared lane markings (SLMs), also called sharrows</b>	For use on low-volume, low-speed roadways to bring awareness of a shared roadway condition	<u>Not considered a bicycle facility per se</u> but a tool used when creating a traffic-calmed, multi-multi-modal environment
<b>Minimum travel lane widths</b>	Outside lane with transit: 11'-12' Inside lane: 11' Two-way center turn lane: 11' min.	According to the AASHTO <i>Green book</i> narrower lane widths are adequate for urban streets with signals and operating speeds 45 mph or less and have advantages, including encouraging slower speeds while still considering freight and fire response routes.



<b>Two-way left turn lane reduction</b>	Reduce to minimum lengths and consider pockets instead of continuous lanes	Two-way left turn lanes could be reduced or potentially removed in locations where there are: low volumes of left turning vehicles, frequent gaps in opposing traffic, and where sight lines are adequate; adding/retaining pockets at high volume left turn lanes may be necessary
<b>Centerline removal</b>	Review if centerlines are required based on street classification and volume of motor vehicles	Centerline reduction or removal should be considered on low-volume, low-speed neighborhood or slow street connections; the removal of the centerline may require classification change to the street

## PART B: PRIORITIZATION AND IMPLEMENTATION

Projects identified for Part B of the Plan were prioritized based on criteria developed from public input and the City's goals. Prioritization is necessary when there are insufficient funds available to complete all the projects as desired. The prioritization analysis assists in developing an annual budget, provide a mechanism for grant opportunities, and help facilitate regional coordination.

The project prioritization scoring (outlined in [Table 4](#)) assessed each project based on factors related safety, connectivity, equity, and ridership. The methodology was designed to allow for the prioritization analysis to be rerun as newer data becomes available over the life of the plan. Factors and weights assigned to each measure were reviewed during the public engagement phase of this plan.

The results of the prioritization can be viewed in the Appendix. [Table 8](#) includes the scores for each prioritization measure for each of the City Bike Plan proposed projects. The prioritization score and resulting rank of bike improvement projects identifies the need and benefit of the projects for their respective routes and corridors. However, the prioritization should be viewed as a tool and not the end-all decision process. Factors such as competitiveness for grants, availability of applicable funding, ability to coordinate with other projects, etc. will factor into the final decision-making of when projects will occur. For example, a bike improvement in and of itself is highly needed with benefits to commuters, students, and recreational users, but too costly to simply provide minor roadway widening and paint. However, if it were coupled with a pavement overlay or transit facility improvement project, the cost can be partially absorbed through the corresponding project for a fraction of the cost.

With a project list including over 30 bicycle facility projects, the focus on which projects to implement first were grouped into three tiers, with the first tier projects including the top 10 projects with the highest prioritization score, followed by the second tier projects which scored a ranking between 11 and 20, and concluding with the third tier which includes the remaining projects that scored at least 5 points. As funds become available, first tier projects will be considered initially, although if a corresponding capital project were to arise that included a bike improvement from the second or third tier, the bike

improvement may be included depending on the relative ease to implement and contributing cost required. The ultimate goal of this Plan is to improve and expand the bike network over time to provide a safer and more convenient system to get around the City.

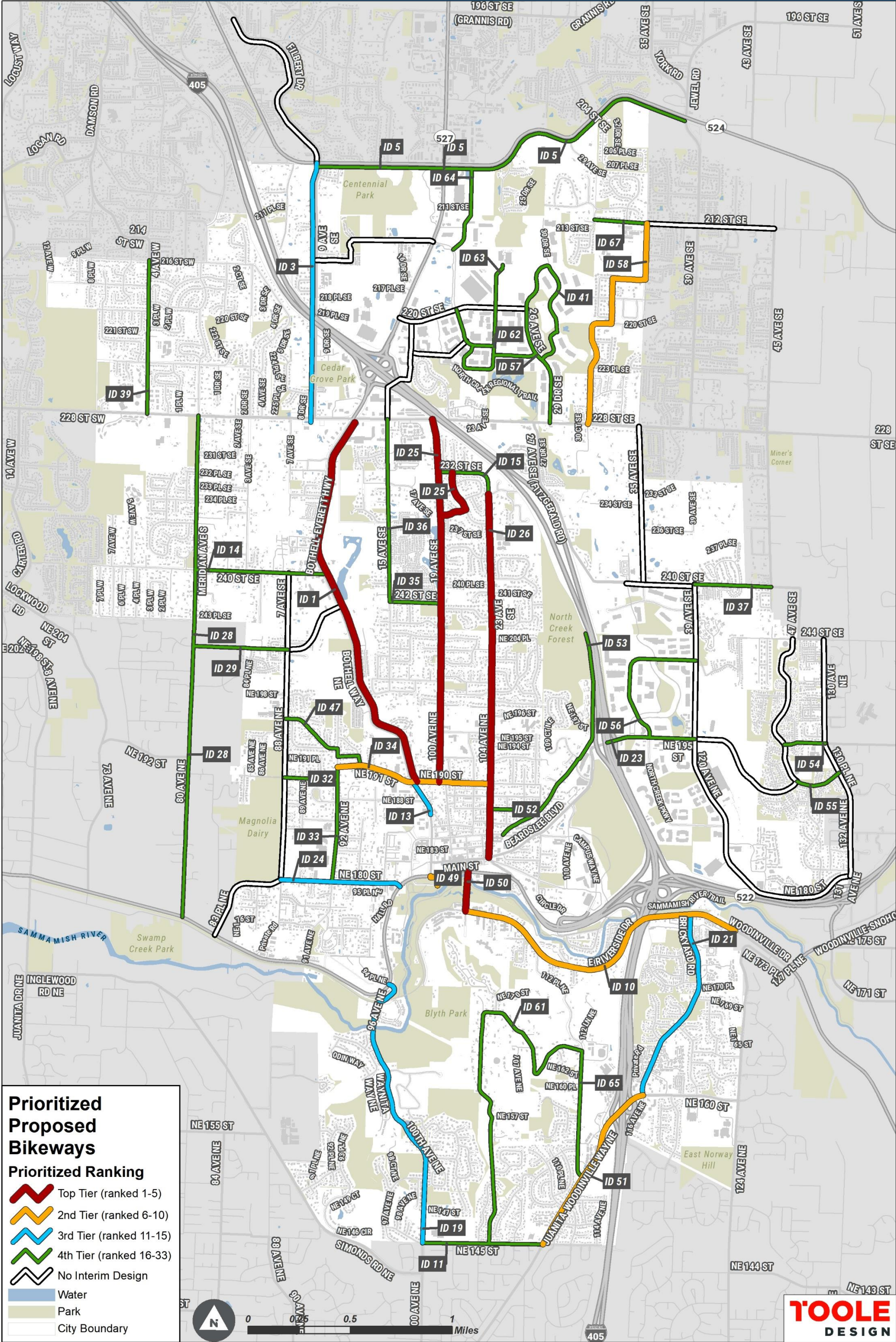
**Table 4. Prioritization Criteria**

FACTOR	CRITERIA	MEASURE	POINTS	
Improve Safety				
	Weighted bicycle crash history	Crash score is greater than or equal to 4	20	
		Crash score is between 2 and 3	10	
		Crash score equals 1	5	
	Facility type	Separated Facility (Shared-Use Path)	20	
		Arterial Roadway	10	
		Collector	5	
		Local	3	
	Total Possible Points			40
	Enhance Connectivity			
	Removes barriers/gaps	Closes system gap	20	
Connection extends system		10		
Total Possible Points			30	
Address Equity				
	Provide health benefits to underserved populations (within 1/4 mile)	Senior Centers	5	
		Low Income Housing	5	
		Library	5	
		Total Possible Points		
Increase Ridership				
	High density center (all apply)	Downtown	10	
		Regional Growth Center	5	
		Multifamily Residential	3	
Schools within 1/4 mile	Elementary	10		
	Middle School	5		
	High School/ University	3		
Parks within 1/4 mile	Regional Park	10		
	Neighborhood park	5		
Transit stops within 1/10 mile	Transit Center	10		
	Bus Stops	5		
Total Possible Points			66	
Total Prioritization Score			151	





# Bothell Citywide Bicycle Plan



Proposed citywide plan is the ultimate configuration that will be implemented as funding becomes available.



## PART B NETWORK FUNDING

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To aid in the selection and implementation of projects, cost estimates were prepared for the Part B projects of the Bike Plan. The cost estimates include design, right-of-way acquisition, and construction costs and are included in the Appendix of this Plan.

The total cost of the projects in Part B of the Bike Plan is approximately \$21,551,600. Of this total, the Tier 1 projects (i.e., Top 10) totals \$9,294,800, the Tier 2 projects total \$7,493,700, and the final Tier 3 projects total \$4,793,100.

The amount to implement Part B of the Bike Plan will be determined during the biennial City budget process in coordination with the update of the Capital Facility Plan (CFP) - which occurs on the same two-year cycle. As an illustrative example, if the Plan began with a budget allocation of \$500,000 annually, consisting of a combination of City and grant funds, it would take about 16 years to complete the Tier 1 projects. These projects would be in addition to those accomplished by large transportation projects and private development.

In addition to funding capital bike projects, a critical element of the Plan is the development of a maintenance and operating budget to maintain the bike facilities over time. The amount to be dedicated to this task should also be considered during the biennial budgeting process.

## PART B: POLICY AND PROGRAMS

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Infrastructure is only part of the solution to making a city more bicycle-friendly. Further discussion and input within the City of Bothell, with stakeholders, and with the general public needs to occur regarding the non-infrastructure elements as described in the following section. As the Bothell Citywide Bike Plan evolves over time, various policies and programs, as well as possible infrastructure revisions could be included with the continued ultimate goal of providing a safe and comfortable and accessible bike network to be used by all.

Efforts should also be made to address non-infrastructure elements such as unsafe behaviors of all roadway users, the development of safe bicycling skills, and general awareness of bicyclists on the roadway. The League of American Bicyclists calls these additional elements the 5 E's. In addition to these elements, further development of this Plan should also develop bicycling enhancements related to signage and wayfinding, bike storage, and the accommodation of the growing use for electric bikes or other low-power wheeled vehicles.

**Engineering:** Creating safe and convenient places to ride and park (i.e. infrastructure).

**Education:** Providing people the skills and confidence to ride.

**Encouragement:** Creating a strong bike culture that welcomes and celebrates bicycling.

**Enforcement:** Ensuring safe roads for all users by deterring the riskiest behaviors.



**Evaluation & Planning:** Planning for bicycling as a safe and viable transportation option through plans, policies, and support programs.

During the project open houses, community members were asked to weigh in on their priorities in terms of developing a safe and connected bicycle network which is the focus of this initial Plan. After connectivity and high-quality, high-comfort infrastructure, support programs such as education, enforcement, and bike parking, were identified as medium-level priorities which could be considered as the Plan evolves and additional bike resources or funding can be identified. These plan elements are recommendations that could be developed to leverage programs undertaken by the City of Bothell, partnering agencies, and volunteer organizations as well as recommendations for additional programs that can help the City communicate these key messages.

It is worth emphasizing the important role that volunteers and advocates will play in improving conditions for bicyclists in Bothell. The City can set the course via policies and infrastructure improvements, but the actions of all citizens both in daily conduct and organized group actions have the power to make bicycling in Bothell enjoyable, safe, and comfortable for a wider range of users. Fortunately, there are groups, clubs and individuals dedicated to improving bicycling conditions in Bothell, from Cascade Bicycle Club and BIKES Club of Snohomish County. Several agencies and organizations could potentially play an active role in encouragement and education efforts, including but not limited King and Snohomish Counties, Bothell Police Department, Bothell Parks and Recreation, the Northshore School District, Washington State Department of Transportation, and local shops. The combined efforts of the City and its partners will help to establish and sustain a healthy bike culture.

## APPENDIX A – BICYCLE LEVEL OF TRAFFIC STRESS

Bicycle Level of Traffic Stress criteria used in this plan align with the below tables.

Table 5: Mixed Traffic

Number of lanes	Effective ADT*	Prevailing Speed						
		≤ 20 mph	25 mph	30 mph	35 mph	40 mph	45 mph	50+ mph
2-way street (no centerline)	0-750	LTS 1	LTS 1	LTS 2	LTS 2	LTS 3	LTS 3	LTS 3
	751-1500	LTS 1	LTS 1	LTS 2	LTS 3	LTS 3	LTS 4	LTS 4
	1501-3000	LTS 2	LTS 2	LTS 2	LTS 3	LTS 4	LTS 4	LTS 4
	3000+	LTS 2	LTS 3	LTS 3	LTS 3	LTS 4	LTS 4	LTS 4
1 thru lane per direction (1-way, 1-lane street or 2-way street with centerline)	0-750	LTS 1	LTS 1	LTS 2	LTS 2	LTS 3	LTS 3	LTS 3
	751-1500	LTS 2	LTS 2	LTS 2	LTS 3	LTS 3	LTS 4	LTS 4
	1501+	LTS 2	LTS 3	LTS 3	LTS 4	LTS 4	LTS 4	LTS 4
2 thru lanes per direction	0-8000	LTS 3	LTS 3	LTS 3	LTS 3	LTS 4	LTS 4	LTS 4
	8001+	LTS 3	LTS 3	LTS 4	LTS 4	LTS 4	LTS 4	LTS 4
3+ thru lanes per direction	any ADT	LTS 3	LTS 3	LTS 4	LTS 4	LTS 4	LTS 4	LTS 4

\* Effective ADT = Average Daily Traffic (ADT) for two-way roads; Effective ADT = 1.67\*ADT for one-way roads

**Table 6: Bike Lanes and Shoulders Not Adjacent to a Parking Lane**

Number of lanes	Width of Bike Lane/Shoulder	Prevailing Speed					
		≤ 25 mph	30 mph	35 mph	40 mph	45 mph	50+ mph
1 thru lane per direction, or unlaned	6+ ft	LTS 1	LTS 1	LTS 2	LTS 3	LTS 3	LTS 3
	4 or 5 ft	LTS 2	LTS 2	LTS 2	LTS 3	LTS 3	LTS 4
2 thru lanes per direction	6+ ft	LTS 2	LTS 2	LTS 2	LTS 3	LTS 3	LTS 3
	4 or 5 ft	LTS 2	LTS 2	LTS 2	LTS 3	LTS 4	LTS 4
3+ lanes per direction	any width	LTS 3	LTS 3	LTS 3	LTS 4	LTS 4	LTS 4

Notes 1. If bike lane / shoulder is frequently blocked, use mixed traffic criteria.  
2. Qualifying bike lane / shoulder should extend at least 4 ft from a curb and at least 3.5 ft from a pavement edge or discontinuous gutter line.  
3. Bike lane width includes any marked buffer next to the bike lane.

**Table 7: Bike Lanes alongside a Parking Lane**

Number of lanes	Bike lane reach = Bike + Parking lane width	Prevailing Speed		
		≤ 25 mph	30 mph	35 mph
1 lane per direction	15+ ft	LTS 1	LTS 2	LTS 3
	12-14 ft	LTS 2	LTS 2	LTS 3
2 lanes per direction (2-way)	15+ ft	LTS 2	LTS 3	LTS 3
2-3 lanes per direction (1-way)		LTS 2	LTS 3	LTS 3
other multilane		LTS 3	LTS 3	LTS 3

Notes 1. If bike lane is frequently blocked, use mixed traffic criteria.  
2. Qualifying bike lane must have reach (bike lane width + parking lane width) ≥ 12 ft  
3. Bike lane width includes any marked buffer next to the bike lane.

## APPENDIX B - SAMPLE INTERSECTION TREATMENTS

The following diagrams show how bicycle facilities can be addressed in three common scenarios found within the City of Bothell:

- Bike route crossing (neighborhood bikeway or local street and collector/arterial with bike lane)
- Shared use trail crossing (midblock crossing of and arterial/collector)
- Sidepath crossing (arterial/collector with parallel shared us path/sidepath and arterial/collector with bike lane)

### EXAMPLE INTERSECTION TREATMENTS

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**Bike Box:**



**Dashed Green Conflict Markings – Intersection/Crossing:**





**Solid Green Conflict Markings – Driveway:**



**Dashed White Conflict Markings – Intersections:**



**Dashed White Conflict Markings – Pocket Right Turn Lane:**



**Green Conflict Markings – Pocket Right Turn Lane:**

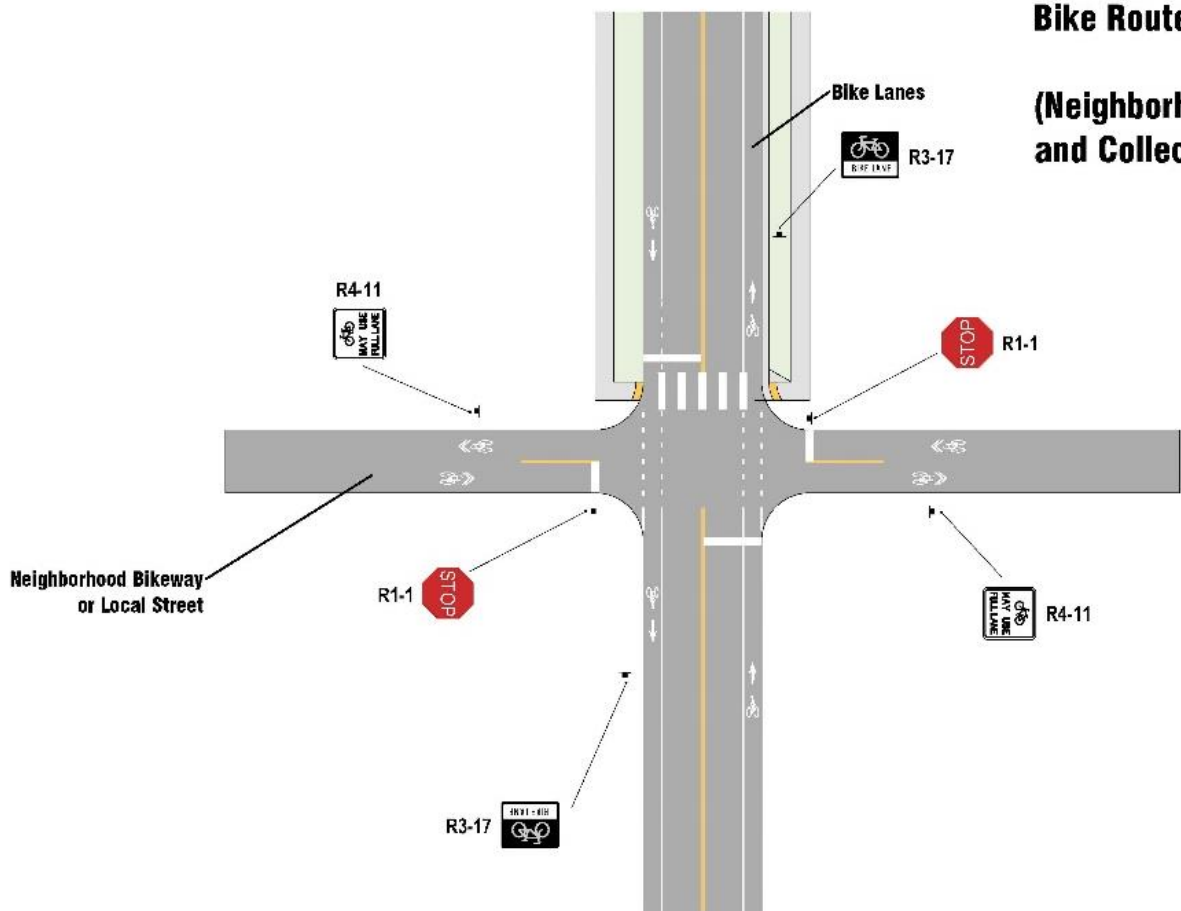


**Raised Shared-Use Path Crossing:**



**Typical Intersection Treatments**  
**Bike Route Crossing**

**(Neighborhood Bikeway or Local Street**  
**and Collector/Arterial with Bike Lanes)**



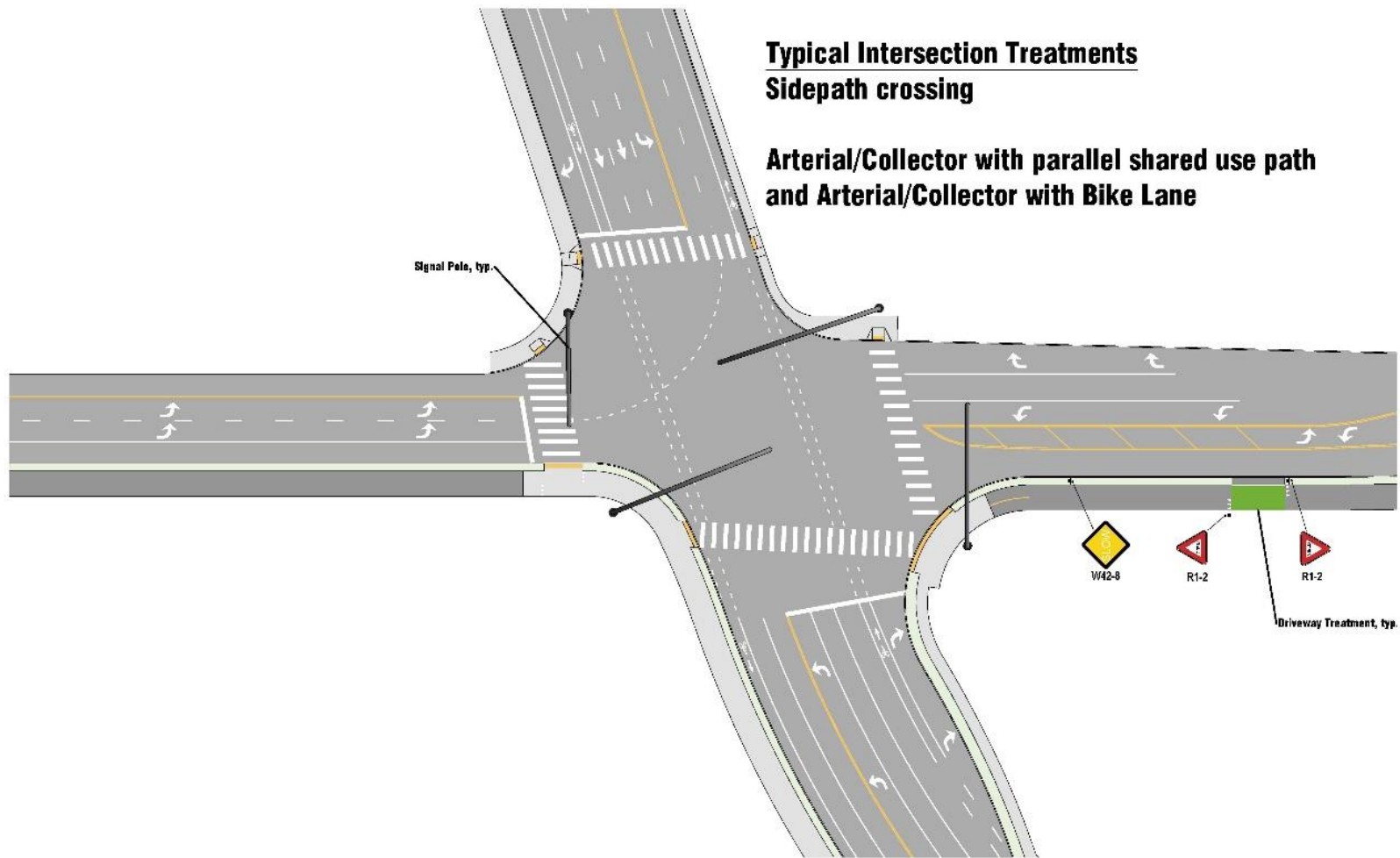


### Midblock, Arterial/Collector

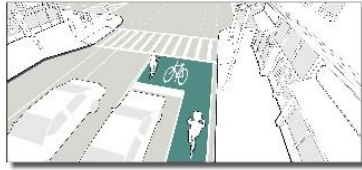


**Typical Intersection Treatments**  
**Sidepath crossing**

**Arterial/Collector with parallel shared use path  
and Arterial/Collector with Bike Lane**

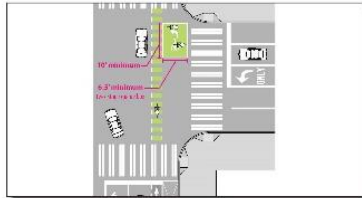


## Typical Intersection & Driveway Treatments



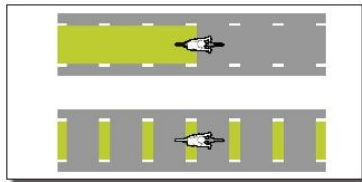
### Bike Boxes

- Moves people biking to the front of the lane minimizing conflict with turning vehicles.
- Allows people biking to shift toward the desired side of the travel way.



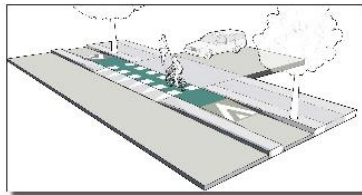
### Two-Stage Turn Queue Box

- Provides a designated space for people biking to wait outside the path of traffic while performing a two-stage left turn.
- Can be used with any type of bicycle facility.



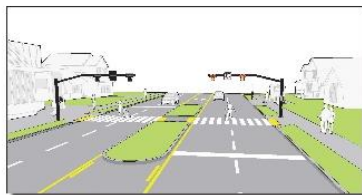
### Bike Lane Extension Markings through Intersections

- Improves visibility of people biking.
- Alerts all roadway users of expected behaviors.
- Reduces conflicts with turning vehicles.



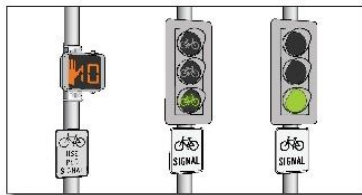
### Driveway Crossing (separated or buffered bike lane)

- Raised crossing
- Conflict area markings



### Crossing Island & Ped/Bike Hybrid Beacon

- Crossing island provides a refuge for bicyclists when crossing multiple lanes.
- Signal allows pedestrians to stop traffic on high volume arterial streets



### Bike Signals, Detection, Actuation

- Provides signals for bicyclists unique needs.
- Provides leading or protected phases for bicycle traffic.
- Detectors set to detect bicycles without detecting vehicles in adjacent lanes.
- Signal timing can be adjusted to accommodate bicyclists.



## APPENDIX C - PUBLIC COMMENTS (TO BE UPDATED)

### *Bikeway Comments*

- Meridian from Kenmore: climbing lane would be good(shoulder disappears at Kenmore City limits)
- Riding on sidewalk is acceptable on 228<sup>th</sup> due to grades
- Why did the cut-through from Riverside Drive to State Route via crossroad (NE 175<sup>th</sup> ST?? near 112<sup>th</sup>?? Missed exact location) close? Reopening this would help divert fast cyclists from trail in key sections where pedestrian volumes are high
- Suggest an off-road connection between Wayne Golf Course and Tolt Pipeline Trail (Back 9)
- Propose wayfinding signs at shared use path junctions, especially one that are essentially sidepaths
- Root heaves on NCT are dangerous and challenging
- Bike parking needed above Park and Ride, closer to downtown
- Maintenance and street sweeping of bike lanes important
- Indicate surfacing differences on trails (soft-surface vs. paved) on trails
- 96<sup>th</sup> Ave NE – bridge from parking lot to old golf course needs widening. Look at striping and signage to address narrow width, “Share the Road” messaging in interim
- 108<sup>th</sup> would make a good bike route through Norway Hill

### *Intersection Comments*

- SB to WB movement from Beardslee to 185<sup>th</sup> – cars going WB conflict with bikes in bike lane going SB. Recommend adding “bike cross” pavement markings and signs (yield to bikes) to increase awareness of bike’s path of travel through intersection. Could also revise intersection geometry to tighten the turning radius for cars making the right turn and reduce the bicycle crossing distance
- 9<sup>th</sup> Ave SE and Filbert Way: bikes not detected at signal

## APPENDIX D - COST ESTIMATES

Table 8: City Bike Plan Prioritization Results

Project ID	Tier	Street Name(s)	From	To	Proposed Facility Type(s)	Length (miles)	Score	Rank	Est. Cost
26	1	23 AVE SE	Kaysner and Valley View	23rd and 232nd	bike lane, climbing lane, sharrows	1.78	121	1	893,000
50	1	102 Ave NE	102nd and Main St	Riverside and 102nd	sharrows	0.19	81	3	43,700
25	1	100 AVE NE	100th and 190th	100th and 232nd	bike lane, none, shared-use path, sharrows	2.11	73	5	2,555,500
34	1	NE 191 ST	104th and 190th	92nd and 191st	bike lane, climbing lane, sharrows	0.76	71	6	649,800
51	1	Juanita Woodinville Way Ne	Juanita-Woodinville and 145th	160th and 116th	bike lane	0.90	61	8	174,800
58	1	31st Ave SE	228th and 31st	35th and 212th	bike lane, climbing lane, sharrows	1.25	59	9	254,600
10	1	E Riverside Dr	102 Ave NE	City Limit	climbing lane, sharrows	1.56	56	11	100,700
36	1	15 AVE SE	15th and 242nd	228th and 15th	bike lane, climbing lane, sharrows	0.89	53	12	1,280,600
5	1	SR 524	9 Ave SE	39 Ave SE	none, shared-use path, two-way bike path (buffered)	1.98	50	13	2,135,600
3	1	9 AVE SE	228 St SE	SR 524	bike lane, sharrows	1.27	48	14	1,206,500
19	2	Waynita Way NE	145th and 100th	96th and 522	bike lane, sharrows	1.40	48	14	1,664,400
24	2	NE 180 ST	180th and 88th	180th and 522	bike lane	0.59	46	15	191,900
41	2	26 PL SE	29th and 26th	26th and 30th	climbing lane	0.81	41	16	465,000 est
57	2	26th Ave SE/29th Dr SE	26th and 220th	29th and 228th	buffered bike lane	0.59	39	17	338,200
63	2	20th Ave SE	220th and 23rd	223rd and 23rd	sharrows	0.78	39	17	111,200 est
28	2	80 AVE NE	228th and Meridian	522 and	bike lane, shoulder	2.45	38	18	2,587,800
39	2	4 AVE W	4th and 228th	216th and 4th	bike lane, climbing lane, protected bike lane, sharrows	0.75	38	18	1,786,000
53	2	Ross Rd	185th and Ross	186th and 105th	neighborhood bikeway	1.17	37	19	166,800 est
62	2	222nd St SE	223rd and 26th	220th and 20th	sharrows	0.56	36	20	79,800 est
33	2	92 AVE NE	92nd and 191st	92nd and 180th	sharrows	0.56	31	21	102,600
61	3	105th Ave NE/10th Ave NE/NE 168th St/10th Ave NE/NE 164th PI	105th and 145th	105th and 146th	sharrows	1.91	31	21	209,000
65	3	112th Ave NE	164th and 112th	112th and Juanita-Woodinville	buffered bike lane	0.63	31	21	701,100

[illegible]